

Research Note 85-88



AD-A167 953

AN ACCOUNT OF SOME EFFORTS DURING THE 1970s
TO CONSTRUCT A SCALE MEASURING SEX-ROLE ATTITUDE IN THE ARMY

Joel M. Savell and John C. Woelfel

for

Leadership and Management Technical Area
William W. Haythorn, Chief

MANPOWER AND PERSONNEL RESEARCH LABORATORY
Newell K. Eaton, Acting Director

DTIC
ELECTE
MAY 28 1986
S D



U. S. Army

Research Institute for the Behavioral and Social Sciences

August 1985

Approved for public release; distribution unlimited.

DTIC FILE COPY

86 5 27 207

U. S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency under the Jurisdiction of the
Deputy Chief of Staff for Personnel

EDGAR M. JOHNSON
Technical Director

WM. DARRYL HENDERSON
COL, IN
Commanding

This report has been cleared for release to the Defense Technical Information Center (DTIC). It has been given no other primary distribution and will be available to requestors only through DTIC or other reference services such as the National Technical Information Service (NTIS). The views, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other official documentation.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER ARI Research Note 85-88	2. GOVT ACCESSION NO. AD-A167953	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) AN ACCOUNT OF SOME EFFORTS DURING THE 1970s TO CONSTRUCT A SCALE MEASURING SEX-ROLE ATTITUDE IN THE ARMY		5. TYPE OF REPORT & PERIOD COVERED Final Report
7. AUTHOR(s) Joel M. Savell and John C. Woelfel		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Army Research Institute for the Behavioral and Social Sciences, 5001 Eisenhower Avenue, Alexandria, Virginia 22333-5600		8. CONTRACT OR GRANT NUMBER(s) --
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Research Institute for the Behavioral and Social Sciences, 5001 Eisenhower Avenue, Alexandria, Virginia 22333-5600		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 2Q262717A767
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) --		12. REPORT DATE August 1985
		13. NUMBER OF PAGES 59
		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release. Distribution unlimited		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) --		
18. SUPPLEMENTARY NOTES --		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Attitude sex-role. women in the Army, measurement.		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) A pool of 174 questionnaire items was developed which appeared to tap a number of dimensions of the sex-role-attitude construct. These items were included in a larger questionnaire administered to some 800 male and female soldiers, both officers and enlisted, at three Army installations. Analysis of the resulting data led to the construction of a 37-item scale. It was decided, however, that for administrative convenience it would be desirable to have a shorter version of the scale; and a new (7-item) version was constructed by (over)		

DD FORM 1 JAN 73 1473

EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

1 SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

selecting items from the 37-item version that met certain criteria. Computations were then carried out to provide data on the scale's reliability (Cronbach alpha) and construct validity. Finally, changes were made in the wording of several items--mainly to reduce ambiguity and possible offensiveness. This (third) version of the scale was included in an Armywide survey administered in 1975 to some 10,000 soldiers, officers and enlisted, and the results of this survey were used to provide information about scale properties in the Army population.

FIG 16

UNCLASSIFIED

ii SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

TABLE OF CONTENTS

Preface.....	1
Introduction.....	2
Construction of the Scale.....	3
Second Version of the Scale.....	10
Third Version of the Scale.....	15
Concluding Comments.....	20
Footnotes.....	23
References.....	25
Appendix A.....	27
Appendix B.....	31
Appendix C.....	33
Appendix D.....	34
Appendix E.....	36

PREFACE

This paper documents some methodological research that was conducted during the 1970s. At the time the report was written (1978), ARI was seeking to develop a scale measuring soldier attitude regarding the role of women in the Army so that any changes over time could be tracked and studied systematically. The research was not completed, however, and at the present time (August 1985) the report is of interest primarily for historical reasons.

Except for the updating of a couple of references and the reformatting of the reference list to accord with the specifications of the third edition of the APA Publication Manual, the paper is presented here exactly as it was written in 1978.

Accession For	
NTIS CRA&I	<input checked="checked" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution /	
Availability Codes	
Dist	Avail and/or Special
A-1	



INTRODUCTION

The Army is today using more women in more different kinds of jobs than it has at any time since the end of World War II, and most expectations are that this trend will continue.¹ In view of this fact, it seemed desirable to try to find out how soldiers are reacting to this development, what factors are able to account for such differences as may be observed, and to what extent soldiers' attitudes and behaviors in this regard are likely to change in the years ahead. The present report presents (the most recent version of) a 7-item sex-role attitude scale that was constructed for use in this research and describes the efforts carried out in the scale's construction.

The effort began in 1972 with a review of the relevant literature followed by a series of discussions (in 1973) between members of the project staff and a team of outside consultants.² The tangible outcome of these discussions was a series of "working papers" setting forth the team's current thinking as to (a) what this sex-role attitude was that was going to be measured and (b) what form it was likely to take (attitudinally) in an Army population. In particular, the team sought to identify as many different attitude dimensions as possible -- the assumption being that, initially, it was better to take into account too many dimensions (and then find some to be unnecessary) than too few (and later find that something important had been overlooked). The general procedure was to hypothesize a set of attitude dimensions, construct a set of items to tap these dimensions, observe the performance of these items in a number of Army subpopulations, and then revise, eliminate, or substitute, as indicated by the results of the observation. Eventually, a set of 174 items was identified that seemed useful for measuring soldiers' sex-role attitudes along a number of dimensions.³ In January 1974 these items were administered to a combined sample of some 800 soldiers at three US Army installations (Fort Dix, New Jersey; Fort Lewis, Washington; and Fort Meade, Maryland); and from this group, 721 usable questionnaires were obtained. The sample included 540 men (75%) and 181 women (25%), 401 officers (56%) and 320 enlisted (44%). The sample design was constructed so as to include both white and non-white respondents and to include installations that varied in type as well as geographical dispersion. At each installation the instructions were that respondents were to be random samples from the specified sub-populations, selected on the basis of the final digits of their social security numbers. And while we were unable to determine the extent to which the local action officers departed from these instructions, conversations with these action officers indicated that such departures (if any) were minor. The results of this survey (and in particular the information obtained about the statistical properties of the items)⁴ persuaded us that it would be possible, using a subset of these items, to construct a scale to measure sex-role attitudes in the Army. Our efforts to do this are described below.

CONSTRUCTION OF THE SCALE

In the process of constructing an attitude scale the researcher makes three decisions: (1) how many items to include in the scale, (2) which items to select from those available for inclusion, and (3) how individual item scores are to be combined so that the respondent can be given a score on the scale as a whole. The seven-item scale presented here is the third of three successive versions, and in the discussion below we describe the decision-making that went into each version.

FIRST VERSION OF THE SCALE

Number of items. It is generally recognized that increasing the number of items in a scale increases the scale's reliability.⁵ Once the number of items reaches 18 to 20, however, the rate of increase in reliability declines. Since we wanted a scale that would make minimal time demands on the individuals to whom the scale would be administered, we decided to construct a scale with about 20 items--a scale, in other words, that was short while still maintaining high reliability.

Selection of items. On the basis of initial analysis of the entire set of 174 items (which included demographic, personal-history, and other social-attitude items as well as items pertaining specifically to sex-role attitudes), we identified 37 that appeared to tap the dimension we desired. Appendix A presents the 37 items and indicates how they are scored. These 37 items were intercorrelated, and the matrix of the intercorrelations, with unities in the diagonals, was subjected to a principal components factor analysis. Table 1 presents the eigenvalues and the percent variance explained for each of the first 20 factors.

Table 1

EIGENVALUES AND PERCENT VARIANCE EXPLAINED PER FACTOR FOR
THE FIRST 20 FACTORS IN THE 37-VARIABLE FACTOR STRUCTURE

FACTOR	Eigenvalue	Percent Variance
I	7.0763	19.13
II	2.5727	6.95
III	1.9948	5.39
IV	1.7634	4.77
V	1.4538	3.93
VI	1.1820	3.19
VII	1.1624	3.14
VIII	1.1131	3.01
IX	1.0499	2.84
X	1.0144	2.74
XI	.9382	2.54
XII	.8762	2.37
XIII	.8680	2.35
XIV	.8259	2.23
XV	.8027	2.17
XVI	.7814	2.11
XVII	.7441	2.01
XVIII	.7287	1.97
XIX	.7146	1.93
XX	.7071	1.91

Inspection of the table shows a relatively strong single factor (Factor I), and Cattell's scree test (Cattell, 1966) suggests this to be the only factor that is significant. The 37 factor loadings for this factor and for factors II and III are presented in Table 2. Examination of the pattern of loadings on Factor I suggests what may be termed a traditional/contemporary orientation toward women. For example, there is a relatively high positive loading of item 5 ("Women should not expect to have all the privileges and responsibilities that men have") on this factor, where higher scores (indicating disagreement) reflect a more contemporary orientation. Similarly, there is a relatively high negative loading for item 20 ("women would make good front-line soldiers if they were trained properly"), where higher scores (again indicating disagreement) reflect

Table 2
FACTOR LOADINGS FOR FIRST THREE FACTORS
FROM 37-VARIABLE FACTOR STRUCTURE

Item	Factor I	Factor II	Factor III
1	.468	-.161	.002
2	.531	.207	-.103
3	-.280	-.258	.245
4	.465	.128	.259
5	.602	-.000	.209
6	.601	.026	-.188
7	-.515	.053	.370
8	-.458	.183	.338
9	-.165	.064	.186
10	.369	.196	.296
11	-.154	-.403	.126
12	.658	-.016	.084
13	.378	.356	.042
14	.627	.349	.016
15	-.090	.280	-.219
16	.033	.514	.073
17	.550	.096	.219
18	.448	.079	.096
19	.535	.260	-.167
20	-.535	.411	.052
21	.154	-.171	-.126
22	.158	-.225	-.064
23	-.483	.364	.339
24	.217	.144	-.609
25	-.302	.446	-.243
26	.652	.181	-.009
27	-.334	.092	.075
28	.469	.459	-.109
29	-.070	-.406	-.001
30	.577	.034	.264
31	-.582	.150	-.019
32	-.610	.023	-.088
33	.382	-.499	-.064
34	-.043	-.118	-.431
35	-.490	.158	-.257
36	-.462	.411	-.133
37	-.118	-.080	-.552

a more traditional orientation. Finally, on items whose wording does not suggest that sex-role attitude is being measured--e.g., item 16 ("I don't like the Army because of its restrictiveness")--the factor loading is approximately zero. Our interpretation then was that respondents who score high on this factor tend to believe that women should have the same privileges and responsibilities that men have. With this interpretation of Factor I, we proceeded to select 18 items (see Appendix B), that loaded maximally on this factor. Close examination of these items, however, suggested that two of them (17 and 19) were ambiguous; and we therefore substituted for them the two items with the next highest loadings. The 18 items selected in this way were items 1, 2, 4, 5, 6, 7, 8, 12, 14, 20, 23, 26, 28, 30, 31, 32, 35, and 36. These 18 items were subjected to a principal components factor analysis, again using unities in the diagonal. Table 3 presents the eigenvalues and percent variance explained for each factor. Once again, inspection of the table shows a relatively strong single factor (Factor I); and again Cattell's scree test suggests this to be the only factor that is significant. The 18 factor loadings for this factor and for factors II and III are presented in Table 4. Again, examination of the pattern of loadings on Factor I suggests that this factor can be described as a traditional-versus-contemporary orientation toward women. Loadings on Factor I and Factor II are shown graphically in Figure 1 as two distinct clusters of items. One cluster consists of ten items (1, 2, 4, 5, 6, 12, 14, 26, 28, and 30) that load positively on Factor I. High scores on these items again appear to reflect a more contemporary view of the role of women, while low scores appear to reflect a more traditional view. The other cluster consists of eight items (7, 8, 20, 23, 31, 32, 35, and 36) that load negatively on Factor I. High scores on these items appear to reflect a more traditional view of the role of women, while low scores appear to reflect a more contemporary view. In summary, the results of our factor analysis of these 18 items suggest that a single factor accounts to a considerable degree for responses to these items. This factor we have referred to here as a traditional-versus-contemporary view of women.

Procedure for combining items. As indicated earlier, some of the items were keyed in a traditional direction while others were keyed in a contemporary direction. To make it easier to interpret individual item scores, we reversed the keying for the eight items that had been keyed in the traditional direction (i.e., those that loaded negatively on Factor I). Thus, all 18 items were now keyed in the same direction, with higher scores indicating a more contemporary orientation and lower scores indicating a more traditional orientation. After this reversal had been completed, we re-factored the entire set of 18 items; and the Factor I loadings obtained for each of the items, plus the eigenvalue and the percent variance explained, are shown in Table 5.

The procedure we decided on for combining individual item scores involved three steps. The first step was to standardize the respondent's item scores (i.e., convert them to z scores) and was simply a strategy

Table 3
EIGENVALUES AND PERCENT VARIANCE EXPLAINED PER
FACTOR FOR 18-VARIABLE FACTOR STRUCTURE

Factor	Eignvalue	Percent Variance
I	5.7412	31.89
II	1.5478	8.60
III	1.2539	6.97
IV	.9590	5.33
V	.8644	4.80
VI	.7962	4.42
VII	.7758	4.31
VIII	.7420	4.12
IX	.6791	3.77
X	.6256	3.48
XI	.5934	3.30
XII	.5755	3.20
XIII	.5393	3.00
XIV	.5373	2.99
XV	.4840	2.69
XVI	.4703	2.61
XVII	.4156	2.31
XVIII	.3996	2.22

Table 4
FACTOR LOADINGS FOR FIRST THREE FACTORS
FROM 18-VARIABLE FACTOR STRUCTURE

Item	Factor I	Factor II	Factor III
1	.4840	-.0632	.1578
2	.5270	.2568	.3003
4	.4614	.3997	-.2016
5	.6146	.2463	-.2502
6	.6251	-.1106	.2686
7	-.5522	.2326	-.4340
8	-.4762	.3841	-.2941
12	.6527	.1122	.0229
14	.6197	.2441	.2576
20	-.5770	.4550	.2482
23	-.5600	.5535	-.0013
26	.6553	.2222	.1781
28	.4704	.3671	.3152
30	.5717	.2746	-.3262
31	-.6214	.1091	.2167
32	-.6190	-.0812	.2732
35	-.5327	-.0390	.3880
36	-.5300	.3552	.2557

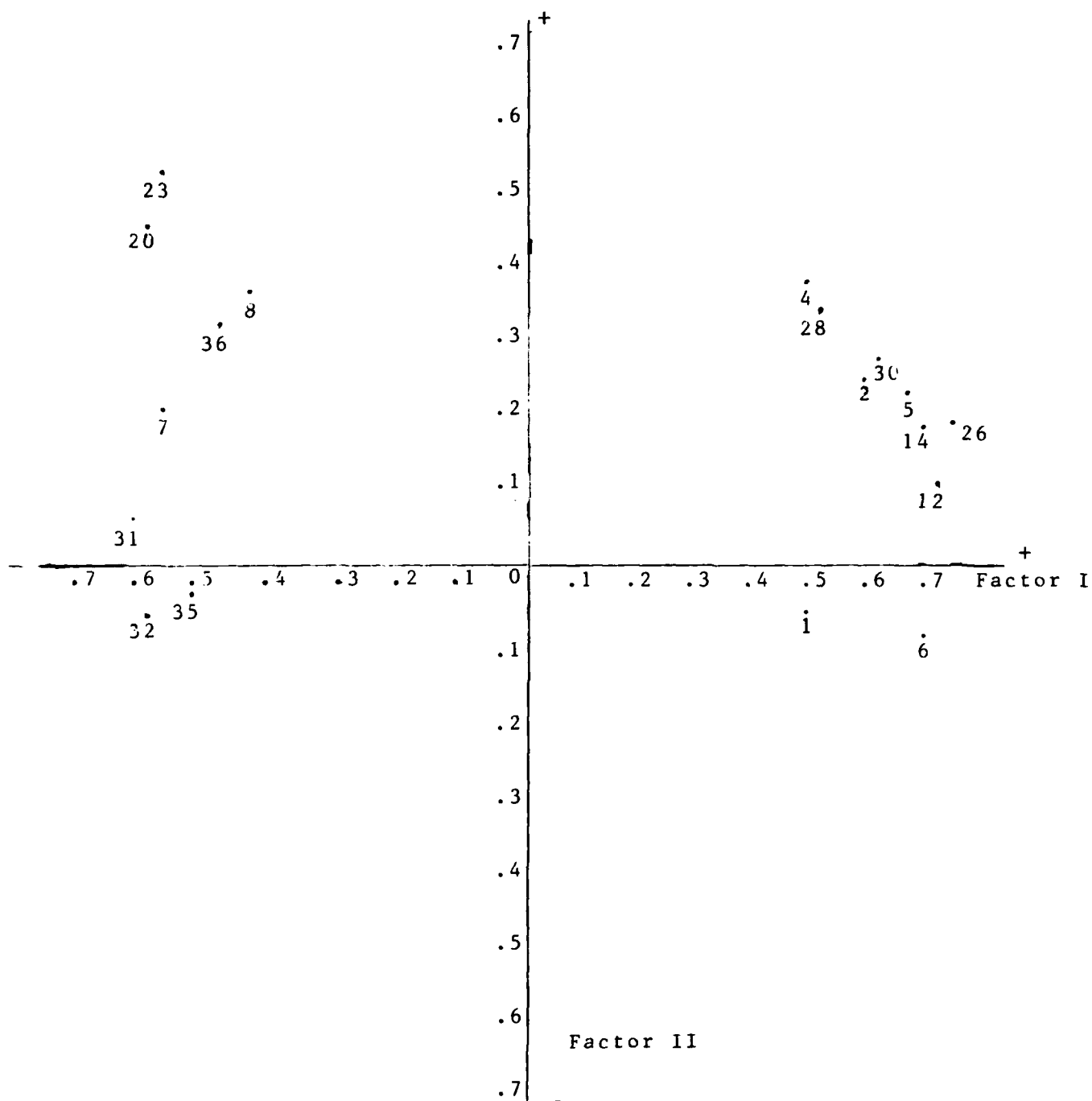


Figure 1. Plot of first two factors from 18-variable factor structure

for providing comparable units of measure in a situation where different items (because they had different numbers of response alternatives) had different ranges of possible scores. The second step was to multiply each \bar{z} score by the appropriate factor loading on Factor I (see Table 5) and was a strategy for weighting the scores according to their ability to predict Factor I. The third step was simply to sum the resulting scores (i.e., the weighted \bar{z} scores) to yield a score on the scale as a whole. For this scale, as for the individual items that went into it, a high score reflects what we have termed a more contemporary orientation toward women while a low score reflects a more traditional orientation. The reliability and validity of this version of the scale will be discussed after we have described the construction of the second version.

Table 5

FACTOR LOADINGS USED TO WEIGHT ITEMS FOR FIRST VERSION OF THE SCALE	
Item	Loading On Factor I
1	.4877
2	.5251
4	.4500
5	.6133
6	.6231
7	.5587
8	.4834
12	.6495
14	.6101
20	.5859
23	.5632
26	.6550
28	.4682
30	.5632
31	.6245
32	.6187
35	.5310
36	.4901
Eigenvalue	5.7412
Percent Variance Explained	31.89

SECOND VERSION OF THE SCALE

Number of items. As indicated previously, we wanted to develop a scale that had high reliability while making minimal demands on the individual soldier to whom the scale would be administered. With this goal, we constructed the 18-item scale described above. We had reason to think, however, that for some purposes an 18-item scale (with its supporting demographics, etc.) would still be too long and that an even shorter scale would be desirable. A series of discussions led to the decision to construct a 5-to-7-item version, with items being selected from the 18-item scale previously developed.

Selection of items. Selection of items for this second version was based on two criteria: (a) the total set of items would have a reliability coefficient in the .70-to-.80 range when measured by Cronbach's internal consistency method, and (b) the individual items would be relatively unambiguous. Application of these criteria led to the selection of the following seven items: 6, 7, 14, 20, 23, 26, and 32, (see Appendix C). Again, the intercorrelation matrix of these items was factor analyzed. Table 6 presents the factor loadings, eigenvalues, and percent variance explained for each factor. Inspection of the table shows a strong single factor (Factor I), and again Cattell's scree test suggests this to be the only factor that is significant. As before, the pattern of these loadings can be described as a traditional-versus-contemporary orientation toward women. Loadings of Factor I and Factor II are shown graphically in Figure 2, again as two distinct clusters. One cluster consists of three items (6, 14, and 26) that load negatively on Factor I. The other cluster consists of four items (7, 20, 23, and 32) that load positively on Factor I. In summary, then, the result of factor analyzing the set of seven items indicates (as was true for the 37-item and 18-item sets) that one major dimension underlies the soldiers' responses to the items used. This dimension we have termed the traditional-versus-contemporary dimension of attitudes toward women in the Army.

Procedure for combining items. As before, keying was reversed for the four items (7, 20, 23, and 32) that loaded positively on Factor I so that for each of the seven items a high score would reflect a more contemporary position. The intercorrelation matrix of these items was then factor analyzed; and Table 7 presents the seven factor loadings for Factor I, plus the eigenvalues and percent variance explained. The same procedure was used in combining items as with the 18-item scale. The seven item scores were standardized and weighted by the appropriate loading on Factor I (see Table 7); and the seven weighted standardized scores were summed to yield a score on the scale as a whole. Again, higher scores are taken as indicating a more contemporary view about the role of women in the Army while lower scores are taken as indicating a more traditional view.

Table 6
FACTOR LOADINGS, EIGENVALUES, AND PERCENT VARIANCE EXPLAINED
FROM 7-VARIABLE FACTOR STRUCTURE

Item	FACTOR						
	I	II	III	IV	V	VI	VII
6	-.6677	.0996	.2897	.6545	.1220	-.0365	.1258
7	.6515	-.0104	-.5376	.2951	.4057	-.1021	-.1561
14	-.6602	.4854	-.0265	-.1448	.2936	.4210	-.0282
20	.6412	.5267	.2231	.1726	-.3173	-.0992	-.3484
23	.6682	.5718	.0991	.0043	-.0133	.1399	.4437
26	-.6698	.4401	-.1215	-.2126	.1079	-.5335	.0379
32	.6310	-.0496	.5830	-.1693	.4685	-.1063	.0008
Eigenvalue	3.0105	1.0462	.7880	.6401	.5977	.5144	.4003
Percent Variance Explained	43.01	14.95	11.26	9.14	8.54	7.40	6.19

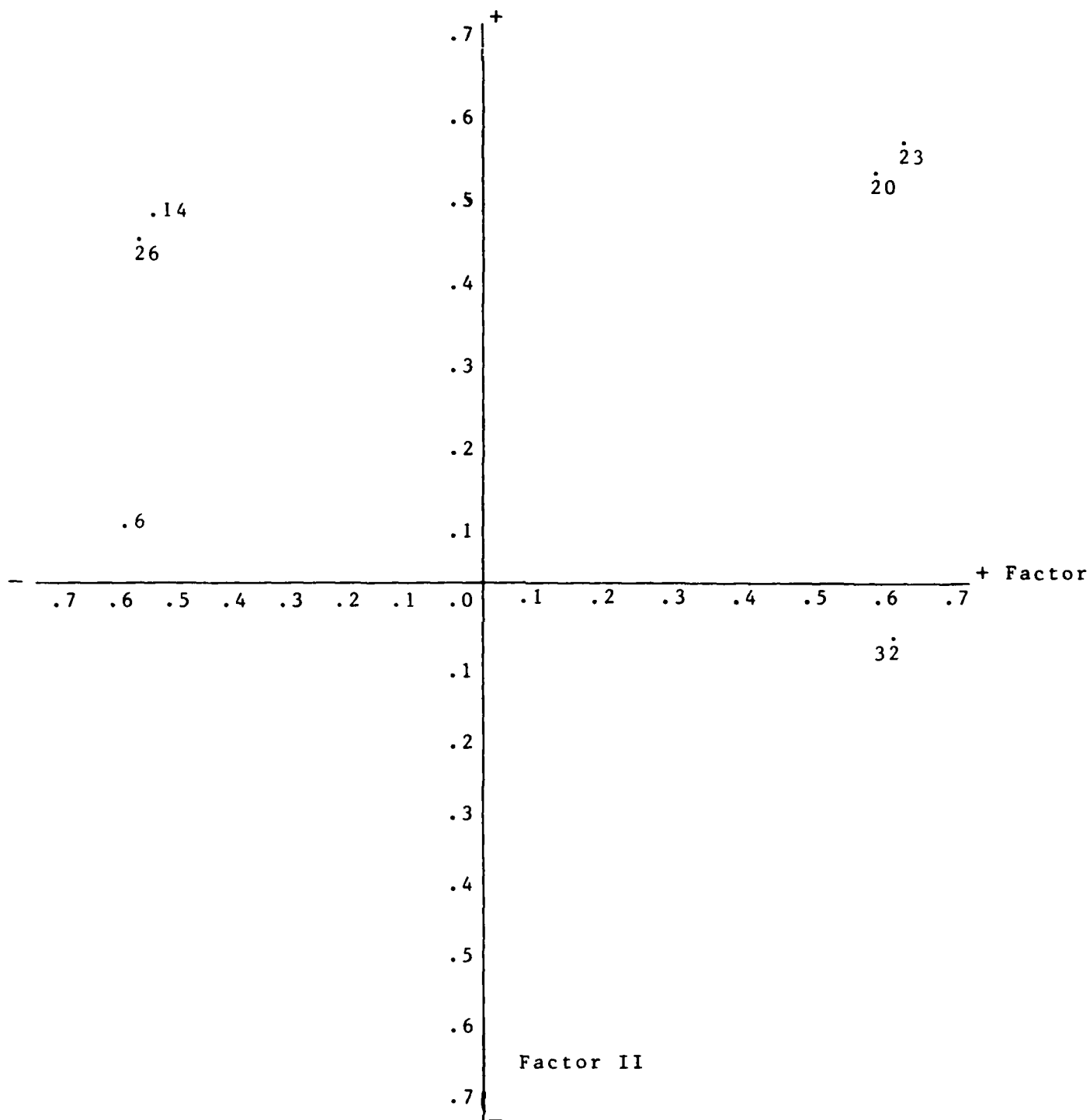


Figure 2. Plot of first two factors from 7-variable factor structure

Table 7

FACTOR LOADINGS USED TO WEIGHT
ITEMS FOR SECOND SCALE

Items	Loading on Factor I
6	.6678
7	.6469
14	.6630
20	.6451
23	.6619
26	.6713
32	.6330
Eigenvalue	3.0095
Percent Variance Explained	42.99

Reliability

Reliability of each of the two scales was measured with Cronbach's alpha, and the coefficients obtained were .88 for the first (18-item) scale and .78 for the second (7-item) scale.

Validity

The question of whether the two scales measure what they are intended to measure was assessed by examining these scales for evidence of face and construct validity. Examination of the wording of the items (see Appendix B) suggests strongly that the primary dimension being measured is indeed a traditional-versus-contemporary orientation toward women in the Army. For example, item 5 asserts that women would not expect to have all the privileges and responsibilities that men have, and item 7 asks about the role women should play in the Army. It should be noted also (see Figures 1 and 2) that for each scale the individual items load heavily and in a similar fashion on Factor I, the factor that empirically defines what the scale is primarily measuring.

Construct validity of the two scales was assessed by correlating the scales with certain variables which, according to prior research and/or theory, should be related to them. One such variable is the sex of the respondent. Previous research has shown that women tend to be more egalitarian in their sex-role attitudes than men (Coye, Denby, Hooper, and Mullen, 1973; Erskine, 1971; Ferree, 1974; Haavio-mannila, 1972; McCune,

1970; Peters, Terman, and Traynor, 1974; Rosenkrantz, Bee, Vogel, and Broverman, 1968; Savell, Woelfel, Collins, and Bentler, 1977), although there are exceptions (See, for example, Ferree, 1974; Savell et al, 1977; Schreiber, 1975). What this means is that whatever the factors are which give rise to male-female egalitarianism, these factors are found more often among women than among men--at least at the present time. If the passage of time brings an increase in the amount of equal status contact (Amir, 1969) between the sexes or an increase in the extent to which norms of male-female egalitarianism are articulated in the media (Schreiber, 1977), we would expect over a period of time to see the correlation between sex and sex-role attitude becoming smaller.⁶

A variable which on theoretical grounds should be related to sex-role attitude is the individual's perception of himself as conservative or liberal in general political outlook (Hershey and Sullivan, 1977), because discussions concerning the role of women have often involved considerations of the "rights" of women; and this topic is, at least in part, political. For one of the items the respondent was asked: "What is your political belief?" and was presented with five response alternatives (conservative, moderate, liberal, radical and other). What we expect here is that those who respond in the more contemporary direction on the sex-role attitude scales will tend to describe themselves as more liberal on the political attitude item than will those who respond to the sex-role attitude scales in the more traditional direction.

Previous research has shown that people tend to have attitudes similar to those of their parents and close friends (see for example Jennings and Langton, 1969; McCloskey and Dahlgren, 1959; Rose, 1957; and Woelfel, 1976; and it is reasonable to suppose that there will be a positive relationship between our respondents' sex-role attitudes and the attitudes held by their parents and close friends. We had no direct measure of the attitudes held by the family and friends of our respondents, but did have a measure of the sex-role attitude that our respondents attributed to these persons. The respondent was presented with two different statements about the proper role of women in society, one statement reflecting a traditional point of view and the other statement reflecting a contemporary point of view (see item #1 in Appendix A). The respondents were then asked to say which of the two statements they thought each of several people would agree with most--their mother, father, closest friend of the same sex, and closest friend of the opposite sex. We expected to find a positive relationship between the respondent's own sex-role attitude (as measured by the two scales described above) and the attitude the respondent attributed to each of these persons.

Finally, previous research has shown that those with more years of formal education tend to be more contemporary in their sex-role attitudes than those with fewer years of formal education (Erskine, 1971; Ferree, 1974; Lipman-Bluman, 1972; Mason and Bumpass, 1975; Savell et al, 1977; Yankelovitch, 1974). These relationships, however, are often small,

sometimes not statistically significant, and appear to vary as a function of what specifically is being asked. (See, for example, Savell et al, 1977; Segal, Kinzer, and Woelfel, in press). In the present case (because the scale included items of more than one type) it seemed reasonable to predict that scale scores would be positively related to education.

Table 8 presents the zero-order correlations between both the first (18-item) and the second (7-item) scales and the seven variables to which these scales were assumed to be related. As can be seen, the correlations are all significant and in the predicted direction; and this fact, plus the apparent face validity of the two scales, supports the belief that the scales are capable of providing satisfactory measures of traditional/contemporary orientation toward women in the Army.

THIRD VERSION OF THE SCALE

As indicated above, the scale developed up to this point had been constructed from items administered to a single sample of an unknown degree of representativeness. The need now was to confirm in another sample (one we had more reason to think was representative of the Army as a whole) that there is indeed a strong single factor underlying the items in the scale and that the scale as a whole has the desired degree of reliability. There was, however, an additional need, and this was to eliminate certain aspects of the wording of several of the items that were potentially offensive. We thought that such changes could be made (along with certain others--see below) without reducing the reliability of the scale as a whole, but this of course had to be determined. These changes (and the reasons for making them) are indicated below.

Changes in Item Wording

Item 6 (See appendix C) refers in one response alternative to the utilization of women in "important" roles and, in another response alternative, to the utilization of women in "support" roles. The intention had been to draw a distinction between roles that involve direct participation in combat (e.g., serving in an infantry or field artillery unit) and roles that involve indirect participation--i.e., providing combat support (e.g., serving in a military police or signal unit). The wording of this item is such, however, that one could read into the item an assumption that support roles are not important--an assumption that most soldiers (particularly those occupying these roles) would naturally find offensive. It seemed to us a fairly simple matter to eliminate this offensive aspect of the item, and this is what we attempted to do (see Appendix D).

Table 8

VALIDITY CORRELATION MATRIX
FOR FIRST AND SECOND VERSIONS OF THE SCALE

Variable	Scale	
	First Version (18 items)	Second Version (7 Items)
Sex ^a	.41***	.37***
Political L-C score ^b	.21***	.17***
Mother attitude	.17***	.13***
Father attitude	.18***	.14***
Peer, same sex attitude	.39***	.32***
Peer, opposite sex attitude	.10***	.16***
Education ^c	.16***	.10**

Note. N ranges between 661 and 692.

^aSex is coded 1-male 2-female.

^bLow scores indicate a conservative political position, higher scores a more liberal position.

^cEducation is coded so that low scores reflect low education, high scores higher education.

** p < .01.
*** p < .001.

7 (Appendix C) asks respondents to say what they think the consequences, if any, would be of placing "a greater number of qualified women in command positions." The intention here had been to find out what soldiers thought would happen if more women were placed in such positions and, in responding, to make the reasonable assumption that any women given such an assignment would have the necessary qualifications. The wording of the item is such, however, that another interpretation is possible. Use of the phrase "a greater number of qualified women" rather than simply "a greater number of women" could be interpreted as a suggestion that many women commanders are not qualified. Again, it seemed to us a fairly simple matter to eliminate this offensive aspect of the item. (Appendix D).

Item 20 (Appendix C) asks the respondent to take a stand on the question of whether women would make just as good front-line soldiers as men would if they were given adequate training. In the original version of the scale, however, the hypothesized condition was not "if they were trained adequately" but "if they were trained properly"--a condition that seemed somehow patronizing. In any event, it again appeared to be a simple matter to change the wording of the item without radically altering the item's meaning. (Appendix D).

There were other items that we thought could be improved--by changing the wording of one of the response alternatives (item 7), by substituting a shorter word for a longer one (item 23), and by eliminating a minor ambiguity (item 23). In addition, some of the team members thought that--in responding to the four agree/disagree items (14, 20, 26, and 32)--respondents who wished to do so should be allowed to indicate that they had no opinion on the matter.

The Armywide Sample

The revised version of the scale (Appendix D) was included in one of the regular (quarterly) surveys conducted by the Army's Military Personnel Center (MILPERCEN) in November/December 1975. The sampling procedure consisted of stratifying by paygrade the active Army population, excluding general officers, and within each paygrade selecting participants randomly by SSAN.⁷ Approximately 10,000 soldiers (officers and enlisted) received a copy of the questionnaire,⁸ 6020 of which--including 5840 which had valid responses to all the scale items--were returned. The respondents who had completed these 5840 questionnaires were taken as the sample for the analyses reported here. This sample included 5474 men (94%) and 366 women (6%), 2103 commissioned officers (36%), 396 warrant officers (7%), and 3331 enlisted (57%). For all computations, scale scores within each paygrade were weighted by a factor reflecting the proportion of the Army excluding general officers represented by individuals in that paygrade. The number of individuals selected from each paygrade and the weighting factors used in the computations are shown in Appendix E.

Statistical Analysis

Based on our experience with the previous version of the scale (which had four items loading positively and three negatively on Factor I), we reversed the keying for the four items in the first set (7, 20, 23, and 32) so that for each of the seven items a high score would reflect a more contemporary position. Item scores were then intercorrelated, and the matrix of intercorrelations was factor analyzed. Table 9 presents the factor loadings, eigenvalues, and percent variance explained for each factor. As before, inspection of the table shows a strong single factor (Factor I); and again Cattell's Screen Test suggests that this is the only factor that is significant. This factor accounts for approximately 41% of the variance--not greatly different from the approximately 43% accounted for in the previous sample. The result of factor analyzing the items in the Armywide sample indicates therefore that (as was the case with the version administered to a sample of unknown representativeness) there is one major dimension underlying soldiers' responses to these items. This dimension still seems describable as the traditional-versus-contemporary dimension of attitudes toward women in the Army.

Reliability

As with the previous versions of the scale, reliability was measured using Cronbach's alpha, and the coefficient obtained was .76. This coefficient is similar to the one (.78) obtained in the analysis of what were essentially the same set of items administered 22 months earlier; and the magnitude of this coefficient indicates that the present version is sufficiently reliable to justify its being used for the purpose intended.

Validity

The indicators of face validity are essentially the same as those discussed in the section dealing with the validity of the previous versions of the scale. Evidence regarding construct validity was sought by correlating the scale with the two relevant variables, education and sex, for which measures had been included in the MILPERCEN questionnaire. It was noted earlier that correlations of sex-role attitude and education tend to be small, especially when (as with some of the items in the present scale) the items ask about the use of women in combat-related roles. The present scale correlated .05 with education ($p < .001$)--a coefficient not greatly different from the one (.10) obtained in the earlier sample.

The scale correlated .22 with sex ($p < .001$). The difference between the magnitude of this coefficient and the one (.37) obtained in the earlier sample may reflect sampling differences or perhaps, as was suggested earlier (page 13), it may be an indication that in 1975 the sex-role attitudes of soldiers were not as predictable from sex as they were in 1974. Whatever the case, it is clear that in both samples the scale scores are related to sex in the way one would expect.

Table 9
FACTOR LOADINGS, EIGENVALUES, AND PERCENT VARIANCE EXPLAINED
PER FACTOR FOR THIRD VERSION OF SCALE

Item	FACTOR						
	I	II	III	IV	V	VI	VII
6	.5686	-.5675	-.2198	.0887	-.3956	-.3761	-.0215
7	.6276	.4791	-.0265	-.0826	-.5001	.2735	-.2102
14	.6070	-.5631	-.0125	-.1312	.0949	.5161	.1475
20	.5271	-.0223	.8155	.2118	-.0226	-.0888	.0571
23	.6932	.1069	.0597	-.6187	.2334	-.2511	-.0646
26	.7276	.0380	-.1973	.3680	.3854	.0026	-.3824
32	.6998	.3913	-.2550	.1864	.0727	-.0743	.4965
Eigenvalue	2.8633	1.0351	.8218	.6297	.6244	.5591	.4665
Percent Variance Explained	40.9	14.8	11.7	9.0	8.9	8.0	6.7

Combining of Items

The same procedure was used in combining items that was used with the previous version of the scale. The seven item scores were standardized and weighted by the appropriate loadings on Factor I (See Table 9, Column 2); and the seven weighted standardized scores were summed to yield a score on the scale as a whole. High scores were taken as reflecting a more contemporary view about the role of women in the Army, while lower scores were taken as reflecting a more traditional view.

Selected Scale Properties

Table 10 presents the mean, standard deviation, and observed range of scores for the third version of the scale--both overall and separately for men, women, commissioned officers, warrant officers, and enlisted personnel. In this version of the scale, as in both previous versions, women scored higher than men.

CONCLUDING COMMENTS

The scale presented here has been shown in an Armywide sample to provide scores that are internally consistent. The items in the scale were shown to have high loadings on a factor which accounted for 41 percent of the variance and which it seemed reasonable to refer to as a traditional-versus-contemporary orientation regarding the role of women in the Army. We have no evidence regarding the scale's ability to predict nonverbal behavior, but scores are related to a variety of other variables in the way one would expect. On the basis of the data available, we conclude that the scale is suitable for use in measuring soldiers' attitudes regarding the role of women in the Army.

Use of the Scale

The information below is provided for those who wish to use this version of the scale with other Army samples and to compare the results obtained from these samples with the results obtained from the November/December 1975 sample of the Army as a whole (Table 10). The procedure to be used is as follows. First, score each item, zero to two or zero to four, as indicated in Table 11. Second, standardize the individual item scores for each respondent using the Armywide means and standard deviations (Table 11) as estimates of the relevant population values. Third, multiply each standardized score by the designated factor loading (see Table 9, column 2). Fourth, sum the weighted standardized scores to provide a total score. This score indexes the scale position of the individual respondent, and it may be used to compute sample means and standard deviations that will then be compared with the Armywide estimates shown in Table 10.

Table 10
SELECTED SCALE PROPERTIES
(Third Version)

Sample	Mean	SD	Range
Total sample (N=5840)	.00	.286	-6.52 to 7.94
Men (n=5474)	-.18	2.82	-6.52 to 7.94
Women (n=366)	2.08	2.50	-5.82 to 7.24
Commissioned Officers (n=2113)	-.07	2.87	-6.52 to 7.24
Warrant Officers (n=396)	-.15	2.98	-6.52 to 7.24
Enlisted (n=3331)	.01	2.86	-6.52 to 7.24

Table 11

SCORES ASSIGNED TO RESPONSE ALTERNATIVES, ESTIMATES OF ARMYWIDE MEANS,
AND ESTIMATES OF ARMYWIDE STANDARD DEVIATIONS

ITEM #	RESPONSE ALTERNATIVE	SCORE ASSIGNED	ARMYWIDE MEAN	ARMYWIDE STANDARD DEVIATION
6	a	0	1.603	.988
	b	1		
	c	2		
	d	3		
	e	4		
7	a	2	.664	.643
	b	0		
	c	1		
14	a	0	2.263	1.283
	b	1		
	c	2		
	d	3		
	e	4		
20	a	4	1.547	1.424
	b	3		
	c	2		
	d	1		
	e	0		
23	a	2	.544	.607
	b	1		
	c	0		
26	a	0	2.487	1.317
	b	1		
	c	2		
	d	3		
	e	4		
32	a	4	2.778	1.231
	b	3		
	c	2		
	d	1		
	e	0		

FOOTNOTES

1. This point is documented and discussed in Savell, J. M., Woelfel, J. W., Collins, B. E., and Bentler, P. M. (1979).
2. We are indebted to the following persons who served in this role: Beth Coye, Arlene Daniels, Diane Dickey, Linda Fidell, Nancy Goldman, Charles Moskos, Jane Prather, Leo Reeder, Shirley Sangri, David Sears, Exequiel Sevilla, Jr., Shirley Star (now deceased), and Martha White. It should be noted, however, that not all of these individuals (nor indeed all members of the research team itself) agreed on all matters pertaining to the development of the scale.
3. The 174 items of which this set consisted were of several different types--e.g., attitude, opinion, knowledge (of Army policies), demographic and personal history. The dimensions used in constructing those items that were of the attitude and opinion types were identified as follows: judged appropriateness of certain jobs for women, pro-male sexism, pro-female sexism, humanitarianism, egalitarianism, sex differences considered significant for job performance, belief in exchange equality, sexual restrictiveness, finding satisfactions in nontraditional sex-role activities, inhibitions in the presence of the opposite sex, perceived compatibility of parental and job roles for women, perceived ability of women to be supervisors, acceptance of women as co-workers, endorsement of stereotypes about Army women, endorsement of stereotypes about Army men, belief as to whether the Army should remain a masculine institution, favorableness toward using women in combat roles, belief about whether there should be separate recruitment and promotion criteria for women soldiers, and belief about whether the women's Army Corps should be continued as a separate organizational entity. These dimensions and the items constructed to measure them were developed by Barry Collins and Peter Bentler.
4. Some of the team members felt that the wording of some of the items could be improved and that it would be desirable to construct and test additional items before proceeding further with the construction of a scale. The members believed however, that the intended examination of attitude trends should begin as soon as possible; and in view of the fact that the available items seemed to have the desired statistical properties a decision was made to proceed using the present pool of items.
5. For a discussion of the relationship between scale reliability and the number of items in the scale, see Nunnally, Psychometric Theory, 1967 (especially p. 22).

6. Tabulations of data from an NORC survey show that the percentages of men and women who said they would be willing to vote for a woman for president were, at each education level, more similar in 1975 than they had been in 1974 (see Schreiber, 1977, Table 2).
7. The number selected in each paygrade was that number determined necessary to allow one to make Armywide generalizations about that paygrade category.
8. In some cases the participants were assembled in one place and filled out the questionnaire in a group. In other cases they received the questionnaire in the mail.

REFERENCES

- Amir, Y. (1969). Contact hypothesis in ethnic relations. Psychological Bulletin, 71, 319-342.
- Cattell, R. (1966). The meaning and strategic use of factor analysis. Pp. 174-243 in R. Cattell (ed.), Handbook of Multivariate Experimental Psychology. Chicago: Rand-McNally.
- Coye, B., S., Hooper, C. C., and Mullen, K. (1973). Is there room for women in Navy Management: An attitudinal survey. Naval War College Review, 69-87.
- Erskine, H. (1971). The polls: women's role. Public Opinion Quarterly, 35, 275-290.
- Ferree, M. M. (1974). A woman for president? Changing responses: 1958-1972. Public Opinion Quarterly, 38, 390-399.
- Haavio-Mannila, E. (1972). Sex-role attitudes in Finland, 1960-1970. Journal of Social Issues, 28, 93-110.
- Jennings, M. K., and Langton, K. (1969). Mothers versus fathers: The formation of political attitudes among young Americans. Journal of Politics, 31, 329-358.
- Lipman-Blumen, J. (January 1972). How ideology shapes women's lives. Scientific American.
- McCloskey, H., and Dahlgren, H. (1959). Primary group influence on Party loyalty. American Political Science Review, 53, 757-776.
- McCune, S. (May 1970). Thousands reply to questionnaire: Many document cases of discrimination. AAUW Journal.
- Mason, K., and Bumpass, L. (1975). U.S. women's sex-role ideology, 1970. American Journal of Sociology, 80, 1212-1219.
- Nunnally, J. (1967). Psychometric Theory. New York: McGraw-Hill.
- Peters, L., Terman, J., and Traynor, J. (1974). Women as managers scale. Abstracted in JSAS Catalogue of Selected Documents in Psychology, 4, 27
- Rose, P. (1957). Student opinion in the 1956 presidential election. Public Opinion Quarterly, 21, 371-376.

- Rosenkrantz, P., Bee, H., Vogel, S., and Broverman, I. (1968). Sex-role stereotypes and self-concepts in college students. Journal of Consulting and Clinical Psychology, 32, 287-295.
- Savell, J., Woelfel, J., Collins, B., and Bentler, P. (1979). Male and female soldiers' beliefs about the "appropriateness" of various jobs for women in the Army. Sex Roles, 5, 41-50.
- Schreiber, E. M. (1975). The social basis of opinions on women's role in Canada. Canadian Journal of sociology, 1, 61-74.
- Schreiber, E. M. (August 1977). The attitudinal "trickle effect:" Education and American opinions of a woman for president. Paper presented at the meeting of the American Sociological Association, Chicago, Illinois.
- Segal, D. R., Kinzer, N. S., and Woelfel, J. C. (1977). The concept of leadership and attitudes toward women in combat. Sex Roles, 3, 469-477.
- Woelfel, J. (1976). Significant others and the political socialization process. Ph.D. dissertation, University of Michigan, Ann Arbor.
- Yankelovich, Daniel. (1974). The new morality: A profile of American Youth in the 1970's. New York: McGraw-Hill.

APPENDIX A

POOL OF ITEMS USED FOR DEVELOPMENT OF SCALES

- *1. Here are two statements about men and women:

Statement 1: Under ordinary circumstances, women belong in the home, caring for children and carrying out domestic duties, whereas men should be responsible for the financial support of the family.

Statement 2: Relationships between men and women are ideally equal and husbands and wives should share domestic, childrearing and financial responsibilities.

Circle the number of the statement you agree with most.

<u>Statement</u>	
1	2

For items presented in the following format the respondent was told that the letters stood for the following response alternatives: strongly agree, agree, disagree, and strongly disagree. These response alternatives were scored 1-4 in that order.

- *2. Men have more common sense than women SA A D SD
3. Women are generally logical when it comes to decision making . SA A D SD
- *4. A woman should choose between a career and a familySA A D SD
- *5. Women should not expect to have all the privileges and responsibilities that men have SA A D SD
- *6. The Army's role is best carried out
- a. by men only
 - b. mostly by men with some women in support roles
 - c. mostly by men with some women in important roles
 - d. equally by men and women
 - e. mostly by women
- *7. If a greater number of qualified women were placed in command positions the effectiveness of the Army
- a. would increase
 - b. would not change
 - c. would get worse

NOTE. Only starred items are those used in the first version of the scale.

- *8. In my specific job I would prefer my boss to be
 - a. a woman
 - b. it makes no difference
 - c. a man
- 9. If I were working alongside a woman and we were doing the same job
 - a. I would like it
 - b. I wouldn't care
 - c. I would dislike it
- 10. Women's mistakes on the job are more excusable than men's . . .SA A D SD
- 11. The Army develops qualities that are good for both men
and womenSA A D SD
- *12. Of all places, the Army should remain a masculine stronghold . SA A D SD
- 13. Many women in the Army are lesbiansSA A D SD
- *14 Women commanders will not generate respect among their
subordinates. SA A D SD
- 15. Many men in the Army are incompetent.SA A D SD
- 16. I don't like the Army because of its restrictiveness.SA A D SD
- 17. I feel that there is no reason for the Army to change any
of its policies regarding women. SA A D SD
- 18. What I like about the Army is its all-male atmosphereSA A D SD
- 19. As long as women have no combat experience, they should
not be considered for important command positions. SA A D SD
- *20. Women would make good front-line soldiers if they were
trained properly.SA A D SD
- 21. When men fight in combat units, they
 - a. become better people
 - b. stay the same
 - c. are badly affected

22. Compared to men, women are naturally

- a. less capable of violence
- b. the same
- c. more capable of violence

*23. If women were assigned to combat units, the Army would

- a. become more effective
- b. stay the same
- c. become less effective

24. Compared to other women, most women in the Army

- a. have looser morals
- b. are the same
- c. have higher moral standards

25. If men are drafted into the Army, women should be drafted too .SA A D SD

*26. Women don't make good bosses at work.SA A D SD

27. Working women set a good example of competence for their children.SA A D SD

*28. Most women who join the Army couldn't get a husband on the outside.SA A D SD

29. Most men who make the Army a career are capable of getting an equally good job outside the Army.SA A D SD

*30. Women shouldn't work at rough, competitive jobs.SA A D SD

*31. Women could work in the "backwoods" as easily as men.SA A D SD

*32. Women should be included in space missions.SA A D SD

33. Women should not be expected to serve in military combat on the front line.SA A D SD

Some jobs are more appropriate than others for women in the Army. You may feel that all jobs are OK for women in the Army, or you may feel that no jobs are OK for women in the Army. Circle one answer for each job depending on whether you think it is OK for women in the Army.

34. Cook.OK NOT OK

*35. Diesel Mechanic.OK NOT OK

*36. Rifle-Carrying Infantry Foot-Soldier. OK NOT OK
37. Social Worker.OK NOT OK

APPENDIX B

FIRST VERSION OF THE SCALE

- *1. Here are two statements about men and women:

Statement 1: Under ordinary circumstances, women belong in the home, caring for children and carrying out domestic duties, whereas men should be responsible for the financial support of the family.

Statement 2: Relationships between men and women are ideally equal and husbands and wives should share domestic, childrearing and financial responsibilities.

Circle the number of the statement you agree with most.

Statement
1 2

For items presented in the following format the respondent was told that the letters stood for the following response alternatives: strongly agree, agree, disagree, and strongly disagree. These response alternatives were scored 1-4 in that order.

- *2. Men have more common sense than women. SA A D SD
- *4. A Women should choose between a career and a family. SA A D SD
- *5. Women should not expect to have all the privileges and responsibilities that men have. SA A D SD
- *6. The Army's role is best carried out
- a. by men only
 - b. mostly by men with some women in support roles
 - c. mostly by men with some women in important roles
 - d. equally by men and women
 - e. mostly by women
- *7. If a greater number of qualified women were placed in command positions the effectiveness of the Army
- a. would increase
 - b. would not change
 - c. would get worse

- *8. In my specific job I would prefer my boss to be
- a. a woman
 - b. it makes no difference
 - c. a man
- *12. Of all places, the Army should remain a masculine stronghold .SA A D SD
- *14. Women commanders will not generate respect among their subordinates.SA A D SD
- *20. Women would make good front-line soldiers if they were trained properly.SA A D SD
- *23. If women were assigned to combat units, the Army would
- a. become more effective
 - b. stay the same
 - c. become less effective
- *26. Women don't make good bosses at work.SA A D SD
- *28. Most women who join the Army couldn't get a husband on the outside.SA A D SD
- *30. Women shouldn't work at rough, competitive jobsSA A D SD
- *31. Women could work in the "backwoods" as easily as men.SA A D SD
- *32. Women should be included in space missionsSA A D SD
- You may feel that some jobs are more appropriate than others for women; or you may feel that all jobs are OK for women in the Army; or you may feel that no jobs are OK for women in the Army. Circle one answer for each job, depending on whether you think the job is OK or not OK for women in the Army.
- *35. Diesel Mechanic.SA A D SD
- *36. Rifle-Carrying Infantry Foot-Soldier.OK NOT OK

APPENDIX C

SECOND VERSION OF THE SCALE

6. The Army's role is best carried out
- a. by men only
 - b. mostly by men with some women in support roles
 - c. mostly by men with some women in important roles
 - d. equally by men and women
 - e. mostly by women
7. If a greater number of qualified women were placed in command positions the effectiveness of the Army.
- a. would increase
 - b. would not change
 - c. would get worse
14. Women commanders will not generate respect among their subordinates. SA A D SD
20. Women would make good front-line soldiers if they were trained properly. SA A D SD
23. If women were assigned to combat units, the Army would
- a. become more effective
 - b. stay the same
 - c. become less effective
26. Women don't make good bosses at work. SA A D SD
32. Women should be included in space missions. SA A D SD

APPENDIX D

THIRD VERSION OF THE SCALE*

6. The Army's mission is best carried out:
 - a) by men only
 - b) mostly by men with some women in support roles
 - c) mostly by men with some women in combat as well as support roles
 - d) equally by men and women
 - e) mostly by women
7. If a greater number of women were placed in command positions, the effectiveness of the Army:
 - a) would increase
 - b) would decrease
 - c) would not change
14. Women commanders will not get much respect from the men in their units.
 - a) Strongly agree
 - b) Somewhat agree
 - c) No opinion at all
 - d) Somewhat disagree
 - e) Strongly disagree
20. Women would make just as good front-line soldiers as men if they were given the same training.
 - a) Strongly agree
 - b) Somewhat agree
 - c) No opinion at all
 - d) Somewhat disagree
 - e) Strongly disagree
23. If women were assigned to combat units, the Army would:
 - a) become more effective
 - b) remain just as effective
 - c) become less effective

* This is the 7-item scale included in the November/December 1975 quarterly MILPERCEN survey.

26. Women don't make good bosses at work.

- a) Strongly agree
- b) Somewhat agree
- c) No opinion at all
- d) Somewhat disagree
- e) Strongly disagree

32. Women should be included in space missions

- a) Strongly agree
- b) Somewhat agree
- c) No opinion at all
- d) Somewhat disagree
- e) Strongly disagree

APPENDIX E

NUMBERS OF SOLDIERS SAMPLED FROM EACH PAYGRADE AND THE
WEIGHTING FACTORS USED IN ESTIMATING POPULATION VALUES.

PAYGRADE	NUMBER SAMPLED*	WEIGHTING FACTOR
E-1	237	8.4367
E-2	401	6.5774
E-3	251	7.1665
E-4	539	8.9330
E-5	511	6.1688
E-6	432	4.7139
E-7	426	3.2147
E-8	327 ^a	1.1030
E-9	119 ^a	
W-1	44 ^b	1.1408
W-2	112 ^b	
W-3	168 ^b	
W-4	80 ^b	
O-1	398	.7792
O-2	413	.8138
O-3	490	1.9065
O-4	438	1.1309
O-5	302 ^c	1.1049
O-6	136 ^c	

*Numbers with the same superscript were combined and
given a single weight.